Entry No. 8RGS-0019

Category	: 8th Rice Genetics Symposium
Select Theme	: Genetic improvement
Endorsement email	:
Keyword 1	: Marker-assisted selection
Keyword 2	: Biotic stress tolerance
Keyword 3	: Genetic gain
Title of Entry	: Basmati rice line development carrying multiple bacterial blight resistant genes pyramided using marker assisted backcross breeding approach
Presenting author	: Muhammad Sabar,
Presenting author email	: muhammadsabar@gmail.com
Co author 1	: Muhammad Akhter,
Co author 2	: Awais Riaz,
Affiliation presenting author	: Rice Research Institute, Kala Shah Kaku, Pakistan.
Affiliation 1	: Rice Research Institute, Kala Shah Kaku, Pakistan.
Affiliation 2	: Rice Research Institute, Kala Shah Kaku, Pakistan.
Select only one type of presentation	: 15 minute oral presentation
Abstract	: Basmati rice is treated as the best rice of the world due to distinctive features including extra-long grain length with a cylindrical shape, more elongation than the width on cooking, pleasant unique aroma, soft and fluffy texture. Pakistan is earning about 1 billion US$ through its export annually. Unfortunately, Basmati rice is being threatened with the biotic stress of Bacterial Leaf Blight (BLB) disease that leads to its poor production and quality deterioration. In order to exploit the most effective, environment friendly and safe approach of host plant resistance, pyramiding of BLB genes was accomplished through marker assisted backcross breeding using Super Basmati as recipient and IRBB60 as donor parents. Bacterial blight (BB) resistant genes Xa4, xa5 and Xa21 were used for introgression. Molecular markers MP1MP2, RM122 and pTA248 were used for Xa4, xa5 and Xa21 genes, respectively for foreground selection. More than sixty polymorphic molecular markers were used for background selection that showed more than 90% recurrent parent genome recovery. Phenotypic traits for grain dimensions were also considered while selecting backcross female parent from BC1F1 to BC5F1 that resulted in background selection resources saving till selfing. Multiple lines carrying BB gene combinations Xa4 +xa5 and Xa4+xa5 +Xa21 were developed. BC5F4 uniform lines showed resistance against BLB disease at hotspot sites. From the developed lines, one line PKBB15-116 having yield advantage of 5% and tolerant to lodging with Basmati quality is under testing of National Uniform Rice Yield Trials. In station yield trials, these pyramided lines in Basmati background will also be helpful for the breeders to incorporate resistant genes in shorter period of time to develop new Basmati rice varieties in future.

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